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EXAMINER
ZITOMER, FRED

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 17

Application Number: 09/909,898
Filing Date: July 23, 2001
Appellants: SUGAYA et al.

Samuel H. Blech
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed June 10, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement that no related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-12 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

5,759,373	TERADA	6-1998
5,350,523	TOMOI	9-1994
5,045,171	MAC DONALD	9-1991
4,876,129	AKAO	10-1989
3,846,521	OSTERHOLTZ	11-1974
4,169,023	SATA	9-1979
6,306,646	SAAD	10-2001
4,775,474	CHAU	10-1988

(10) Grounds of Rejection

The following grounds of rejection are applicable to the appealed claims:

REJECTION OF PRODUCT CLAIMS 1-4, 11 AND 12 UNDER 35 U.S.C. 103(a)

Claims 1-4, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada et al., US 5,759,373, hereinafter Terada '373, taken with Tomoi et al., US 5,350,523, hereinafter Tomoi '523.

Terada '373 relates to membranes useful for treating solutions comprising ion exchange resins, thermoplastic support polymers absent exchange groups and porous membrane supporting

materials [column 1, line 7 – column 2, line 4]. Membranes comprising strong base anion exchange resins, the instant thermoplastic support polymers absent exchange groups and the instant amounts thereof are disclosed [column 4, line 8 - column 5, line 12]. Vinylbenzyltrimethylammonium chloride and derivatives thereof, i.e quaternary amines in the class of and/or encompassing resins within instant formula (1), are disclosed [column 5, lines 4-11]. Vinylbenzyltrimethylammonium chloride, the closest specific anion exchange resin disclosed, is outside present formula 1 in that component "A" is a C_1 methylene group as opposed to a C_{3-8} methylene group. The membranes are useful in electrodialyzers [column 3, lines 63-65; column 6, lines 6- 41; Examples 1-4; claims 5 and 10-13]. The reference is silent on suitable temperatures for using the membranes, however, it is deemed pertinent that ambient temperatures are used in all the examples. While Terada '373 is silent on the unsaturated bond ratio of instant claim 2 the omission is not deemed to impact patentability because the claim language reads on thermoplastic polymers having no unsaturated bonds, i.e. within the limits of the independent claim. Nevertheless it is noted that most of the thermoplastic polymers set forth in Appellants' disclosure [paragraph bridging pages 10 and 11] are disclosed by Terada '373 [column 4, lines 56-65]. The polymers are all chemicals of commerce absent any teaching by Appellants or the reference to alter the unsaturated bond ratio beyond what is supplied by the manufacturer. Tomoi '523 teaches anion exchange resins within instant formulas (1) and (2) [Abstract; column 3, lines 3-51; column 5, lines 28-45]. Component "R" of Tomoi '523 is "$-(CH_2)_{3-18}-$" which corresponds with and encompasses instant component "A" [column 3, lines 33-39]. The resins are characterized by enhanced thermal stability [column 3, lines 40-51].

More directly, thermal stability decreases above 60° C. as the length of the carbon atom chain in component "R" decreases below 3 as manifested by detachment of the quaternary ammonium ion exchange groups [column 2, lines 17-41]. This is significant in view of Appellants' comparative examples, viz. Examples 2 and 3, set forth in the disclosure to show unexpected results. Said examples contain polymers wherein component "A" is a one carbon methylene group and the resin is exposed to temperatures of 80°C. for 6 months, a condition disclosed by Tomoi '523 to cause instability. Clearly, the known unsuitability of exposure temperatures above 60°C. for the comparative examples renders Appellants' comparisons intended to show unexpected results based solely on the carbon chain length of instant component "A" insufficient. Terada '373 differs from the instant invention by not limiting the chain length of instant component "A" to 3-8 carbon atoms.

It would have been obvious to modify the anion exchange membranes of Terada '373 to contain component "A" connecting groups of 3 to 8 carbon atom chains in the expectation of realizing enhanced thermal stability because Tomoi '523 teaches the embodiment for the same class of resins disclosed by Terada '373.

REJECTION OF PROCESS CLAIMS 5-9 UNDER 35 U.S.C. 103(a)

Claims 5-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Terada et al., US 5,759,373, taken with Tomoi et al., US 5,350,523, as applied to claim 1-4, 11 and 12 above, and further in view of MacDonald, US 5,045,171.

MacDonald teaches preparing anion exchange membranes for electrodialysis apparatuses comprising a quaternary ammonium ion monomer unit [column 4, lines 52-59] and a

thermoplastic support [column 8, lines 5-13] by combining the precursor quaternary ammonium ion monomer and the thermoplastic, alternatively impregnating the thermoplastic, and then polymerizing the monomer [column 8, lines 13-27]. Presumably the resultant membranes are a graft and/or a mix of the two polymers. Terada '373 and Tomoi '523 differ from the instant invention by polymerizing the quaternary ammonium ion monomer and then combining the resultant polymer with the thermoplastic to form a polymer mix which serves as a precursor for the membrane. It would have been obvious to prepare anion exchange membranes by polymerizing a quaternary ammonium ion monomer in the presence of a thermoplastic support in the expectation that the membrane would be suitable for use in electrodialyzers because MacDonald teaches the embodiment for the same starting materials as Terada' 373 and Tomoi '523.

REJECTION OF PROCESS CLAIM 10 UNDER 35 U.S.C. 103(a)

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Terada et al., US 5,759,373, taken with Tomoi et al., US 5,350,523, and further in view of MacDonald, US 5,045,171, as applied to claims 1-9, 11 and 12 above, and further in view of Akao, US 4,876,129, or Osterholtz, US 3,846,521, or Sata et al., US 4,169,023, or Saad et al., US 6,306,646, or Chau et al., US 4,775,474.

The patent literature is replete with references teaching irradiating thermoplastic polymers, i.e. the instant membrane supporting materials, with electron beams or γ-rays to initiate and/or optimize procedures associated with crosslinking, grafting, diffusion, hydrophilicity, adhesion, permeability etc. See e.g. Akao [column 5, lines 35-59] or Osterholtz

[column 1, lines 20-30] or Sata [column 16, lines 60-68] or Saad [column 1, lines 3-15] or Chau [column 4, line 14 - column 5, line 6; Example 1]. Terada '373, Tomoi '523 and MacDonald differ from the instant invention by being silent on irradiating the claimed membranes. It would have been obvious to irradiate the membranes of Terada '373, Tomoi '523 and MacDonald in the expectation of effecting changes in physical and/or chemical properties because Akao or Osterholtz or Sata et al. or Saad et al. or Chau et al. teach the embodiment for treating the thermoplastics of Terada '373, Tomoi '523 and MacDonald .

(11) Response to Argument

The assertion that Terada '373 fails to disclose that the present anion exchange resin and thermoplastic polymer are "mixed substantially uniformly" as defined at page 5, lines 7-14 of the specification is not persuasive because the features upon which Appellants rely (i.e., that no phase distinction can be observed between the resin and thermoplastic polymer by an optical microscope and that phase separated structures having a size less than 1 μm cannot be observed) are not recited in the rejected claims. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Nonetheless it is noted that Appellants' definition is indefinite and therefore insufficient to limit a claim. This is because critical parameters (e.g. magnification, type of light, staging etc.) under which optical microscopes are operated are not given. Absent such conditions the claims afford no guidance to one of ordinary skill in the art and cannot therefore be said to be further limited. Further, the 1μm phase separation limitation appears to be a contradiction in terms in view of the limitation

that no phase separation can be observed.

In regard to the assertion that Terada '373 fails to teach the claimed method of mixing a monomer and a thermoplastic polymer it is well settled that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the present case MacDonald not Terada '373 is relied upon to teach mixing the instant starting materials.

The assertion that MacDonald only teaches monomers such as vinyltrialkylammonium chloride as the polymerizable monomer is another attack on a single reference. Tomoi '523 not MacDonald is relied upon to teach the embodiment.

The assertion that no motivation is given for substituting the anion exchange resin of Terada '373 with the anion exchange resin of Tomoi '523 is not understood. As noted above the substitution would be obvious to one of ordinary skill in the art desiring to enhance the thermal stability of Terada '373 membranes.

The assertion that unexpected results have been shown in instant Comparative Example 3 at page 20 is not understood and appears to be an apples and oranges comparison. Conspicuously absent in this regard is any head-to-head comparison of membranes of the same composition differing only in the means of preparation. The only showing of criticality on this record is the disclosure by Tomoi '523 that thermal instability increases when Component "R" contains less than a three carbon connecting group as noted above.

The assertion that the various additional references applied to Claim 10 do not relate to

the instant anion exchange membranes is yet another attack on a single reference. Each of the cited references teaches irradiating the instant thermoplastics for the purpose of improving or imparting desired properties and nothing on this record teaches that said thermoplastics would not react similarly when contained in the present membrane structures.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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